

**Monitoring Report for
CSMRI Site
Second Quarter 2008**

Prepared for:

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Golden, Colorado

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1. Introduction

This report presents the second quarter (April, May, June) 2008 results for groundwater monitoring and surface water monitoring conducted at the Colorado School of Mines Research Institute (CSMRI) site in Golden, Colorado. The monitoring was conducted by the S.M. Stoller Corporation (Stoller).

2. Sampling and Analysis

Stoller obtained quarterly samples of groundwater and surface water on April 15, 17, and 18, 2008 from 10 groundwater monitoring wells and two surface water sample locations. Groundwater quality samples were obtained on April 15 (CSMRI-1B, CSMRI-2, CSMRI-6B, CSMRI-9, CSMRI-10 and CSMRI-11), April 17 (CSMRI-1B, CSMRI-2, CSMRI-4, CSMRI-5, CSMRI-6B, and CSMRI-8), and April 18 (CSMRI-1 and CSMRI-1B). Monitor well CSMRI-1B was visited three times and monitor wells CSMRI-2 and 6B were each visited twice in order to provide sufficient volume of water for sampling. Monitor well CSMRI-7B did not provide sufficient volume of water for sampling.

Surface water samples were collected on April 18 from both SW-1 and from SW-2. Aqueous samples were placed in iced coolers and couriered to Paragon Analytics Laboratory, Inc. of Fort Collins, Colorado for analysis.

The two air samplers located on the CSMRI site that were in place for monitoring airborne particulates during soil removal activities were removed in December 2007.

Figure 1 presents the monitor well and surface water sample locations. The figure also presents a groundwater potentiometric surface elevation map based on depth to groundwater relative to the surveyed top-of-casing for the time periods of April 15 through April 18, 2008. The elevation of the groundwater potentiometric surface at the time of sampling is posted adjacent to each monitor well location. The figure indicates a northeasterly component of flow for groundwater located on the bench terrace above the Clear Creek floodplain.

2.1 Groundwater Sampling

Groundwater samples were obtained from all monitoring wells except from CSMRI-7B. Monitor wells CSMRI-1B, CSMRI-6B, CSMRI-7B, CSMRI-8, CSMRI-9, CSMRI-10, and CSMRI-11 were installed in February 2007. Monitor well as-built construction diagrams and borehole lithology were provided in Appendix I of the March 2007 quarterly report.

Water quality samples were collected following the procedures outlined in Appendix A, Groundwater Sampling Procedures. All monitor wells have depth to water measured relative to top-of-casing to the nearest 1/100th of a foot (0.01) prior to sample purging. Graphs of water table elevation are presented as Figure 2 for monitor wells CSMRI-1, CSMRI-4, and CSMRI-5, and as Figure 3 for monitor well CSMRI-2. The hydrograph figures (Figures 2 and 3) present data for the four monitor wells that have been measured quarterly since March 2005. As potentiometric surface data are developed for the seven monitor wells that were installed in February 2007, the data will be incorporated into hydrographs.

The Figure 2 hydrograph reflects the seasonal trends of flow in Clear Creek due to the proximity of select monitor wells to the creek. Monitor well CSMRI-1 is located upstream of CSMRI-4 and CSMRI-5, which accounts for the difference in elevation of the water table between the wells as shown on Figure 2.

The Figure 3 hydrograph of monitor well CSMRI-2, located near the southeast corner of the freshman parking lot on West Campus Drive and the Welch Ditch, reflected the use of and leakage from the adjacent irrigation ditch during the summer months in 2005 and 2006 by a rise in the potentiometric surface. Through 2007 the water level has remained elevated and only recently has declined with the last several rounds of measurements.

Sample collection field forms that record the water quality parameters of the monitor well water as it is purged and the volume removed are provided in Appendix B, Sample Collection Forms. After parameter stabilization, the water samples are filtered through a 0.45 micron (μ) filter, collected in laboratory-provided containers, and preserved in the field as appropriate for the analyte and analytical method.

2.2 Surface Water Sampling

Surface water samples from Clear Creek were collected from two locations: one upstream of the site and one downstream of the site as shown on Figure 1. Samples were collected on April 18, 2008 for SW-1 and SW-2. The surface water samples were collected following the procedures outlined in Appendix C, Surface Water Sampling Procedures. Surface water samples are filtered through a 0.45 μ filter, collected in laboratory-provided containers, and preserved in the field as appropriate for the analyte and analytical method.

Discharge data of stream flow in Clear Creek during the second quarter from April 2008 through June 2008 is not available. The US Geological Survey, National Water Information System: Web Interface indicates the data from station 06719505 (Clear Creek at Golden, CO) is unavailable because a new rating is being developed for this site. Discharge data from this station will be available in July 2008.

2.3 Analyses

All samples collected were analyzed using a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)-certified analytical laboratory. The results received from the laboratory were evaluated based on the following parameters:

- Data completeness
- Holding times and preservation
- Instrument initial calibrations
- Instrument performance checks
- Preparation blanks
- Duplicate sample results
- Laboratory control samples results
- Compound quantization and reporting limits (full validation only)

As a quality control/quality assurance (QA/QC) check, an equipment blank sample was collected in the field by pouring distilled water through a sample bailer and submitting the filtered aqueous sample for the identical analytical parameters as the groundwater and surface water samples. The results of the equipment blank analyses did not identify any interferences or anomalies in the laboratory data.

A copy of the Data Validation Report documenting the reanalysis of the thorium activity is also presented in Appendix D.

2.3.1 Groundwater Quality Analyses

Paragon Analytics Laboratory, Inc. conducted laboratory analyses of the aqueous samples. The groundwater and surface water samples were analyzed for the metals: Ag (silver), As (arsenic), Ba (barium), Ca (calcium), Cd (cadmium), Cr (chromium), Hg (mercury), K (potassium), Mg (magnesium), Mo (molybdenum), Na (sodium), Pb (lead), Se (selenium), V (vanadium), and Zn (zinc) as well as the radioisotopes: radium (Ra-226 and Ra-228), thorium (Th-228, Th-230, and Th-232), and U (uranium). Since the first quarter of monitoring in February 2005, the concentration of total uranium in micrograms per liter ($\mu\text{g/l}$) had been analyzed using Paragon method 714R9. In this method, the concentration of uranium is calculated based on the activity of the uranium isotopes U-234, U-235, and U-238. Effective with the first quarter 2007 sampling event, the concentration of uranium is now analyzed using mass spectrometry method EPA 6020, which analyzes for total uranium and not for the activity of the individual isotopes. The laboratory results of these analyses are presented in Appendix E on a compact disk as a series of Excel spreadsheets. Appendix F presents copies of the Chain-of-Custody for the CSMRI samples.

A summary of groundwater results for radioisotopes and metals is presented in Table 2-1 and Table 2-2, respectively. Groundwater parameters are reported as dissolved concentration in milligrams per liter (mg/l) for metals, picoCuries per liter (pCi/l) for radioisotopes, and micrograms per liter ($\mu\text{g/l}$) for uranium. Groundwater samples were measured onsite for temperature, pH, and specific conductance during the purging and sampling process. Onsite measurement parameters are presented on the sample collection forms in Appendix B.

2.3.2 Surface Water Analyses

A summary of Clear Creek surface water results for radioisotopes and metals is presented in Table 2-3 and Table 2-4, respectively. Surface water parameters are reported as dissolved concentration in mg/l for metals, pCi/l for radioisotopes, and $\mu\text{g/l}$ for uranium. Surface water samples were measured onsite for temperature, pH, and specific conductance as the sampling was conducted. Onsite measurement parameters are presented on the sample collection forms in Appendix B.

2.4 Health and Safety Program

Stoller developed a program to protect the health and safety of field personnel for implementation of the environmental monitoring at the CSMRI site. This program has been developed in accordance with requirements of 29 CFR 1910.120.

3. Results

Results from samples collected from the CSMRI site during the second quarter 2008 are summarized on Tables 2-1 through 2-4. Table 2-5 presents historical data collected by previous consultants for select contaminants of potential concern in groundwater at the site. The historical uranium data presented in Table 2-5 are presented in pCi/l as “activity” yet recent (2005 through 2008) analytical data are presented in µg/l as “mass concentration.” The December 7, 2000 Federal Register discusses the final uranium maximum contaminant level (MCL) and presents a conversion factor of a geometric average mass:activity ratio of 0.9 pCi/g for values near the National Primary Drinking Water Standards MCL, based on data from the National Inorganics and Radionuclides Survey.

Tables 2-6 and 2-7 present the quarterly historical groundwater radioisotopic and metals sample results, respectively, collected by Stoller since February 2005. Tables 2-8 and 2-9 present the quarterly historical Clear Creek surface water radioisotopic and metals sample results, respectively, collected by Stoller since February 2005.

3.1 Groundwater Conditions

Groundwater monitor wells are located in areas likely to detect impacts, if any, to groundwater emanating from the site as well as locations that represent background water quality. Wells CSMRI-4 and CSMRI-5 are located downgradient from the site in the Clear Creek flood plain. Well CSMRI-1 is located along Clear Creek upstream from the site, and well CSMRI-2 is located offsite on the southeast corner of the freshman parking lot on West Campus Drive.

In February 2007, seven new groundwater monitor wells were installed to assess the effectiveness of the source excavation and stockpile creation that were conducted during the summer of 2006. Monitor well CSMRI-8 is located along Clear Creek within the flood plain area; and monitor wells CSMRI-1B, CSMRI-6B, CSMRI-7B, CSMRI-9, CSMRI-10, and CSMRI-11 are located on the upland areas and essentially encircle the CSMRI site.

3.2 Groundwater Quality

Groundwater samples were collected from ten monitor wells and tested for the presence of metals and radioisotopes as identified in Section 2.3.1. No groundwater sample was collected from monitor well CSMRI-7B due to no water in the well at the time of sampling.

The measured activities of Ra-226, Ra-228, Th-228, Th-230, and Th-232 for all groundwater monitor wells were below their respective MCL standards as shown in Table 2-1. Uranium was detected in monitor wells CSMRI-4 (62 µg/l) and CSMRI-8 (770 µg/l) at concentrations exceeding the MCL of 30 µg/l. Uranium was also detected in the remaining seven groundwater monitor wells but at concentrations well below the MCL.

The detected concentration of uranium in CSMRI-9 at 22 µg/l will be monitored since initial sampling at this location in February 2007 indicated a concentration of 7.9 µg/l. The concentration of uranium then spiked to 35 µg/l but has steadily decreased in the past three quarterly sampling events. This monitor well is located at the top of the slope that rises above the Clear Creek flood plain.

In the flood plain area, uranium was detected in monitor wells CSMRI-4 at 62 µg/l, CSMRI-5 at 6.7 µg/l, and CSMRI-8 at 770 µg/l. Uranium in monitor well CSMRI-4 has historically had elevated concentrations of uranium, but the values had been declining since 1991 until the last several quarterly sampling events. Figure 4 illustrates the decreasing concentration of uranium in CSMRI-4 since 1991. Historically, the concentration of uranium in this monitor well has spiked; once in 1999 and then again in 2003. The spike in the concentration of uranium in 2003 was attributed to precipitation effects at the CSMRI site and removal of the site asphalt and concrete as discussed in Section 4.2.2 of the New Horizons RI-FS (New Horizons 2004). Soil remediation activities in the flood plain area in December 2006 may have affected the recent rise in the concentration of uranium in this monitor well. This is commonly observed after soil remediation activities.

Figure 5 presents the uranium concentration and the elevation of the water table from 2005 through the second quarter (April) 2008 at monitor well CSMRI-4. The figure indicates the concentration of uranium had previously been fluctuating seasonally slightly above to slightly below the MCL of 30 µg/l for seven quarterly sampling events in 2005 and 2006. The second quarter 2006 concentration of uranium of 26.8 µg/l for CSMRI-4 in Figure 5 may not be valid due to analytical laboratory tracer recoveries of less than 20 percent. A discussion regarding the validity of this data point was presented in the second quarter 2006 report. An ice chest from the fourth quarter 2007 (December) sampling event was lost by the courier service resulting in a gap in the analytical data for CSMRI-4.

Uranium was detected at a concentration of 6.7 µg/l in monitor well CSMRI-5. Historical data from Tables 2-5 and 2-6 indicate concentrations of uranium between 2 µg/l and 4 µg/l. Beginning in September 2006, the concentration increased to a high of 11 µg/l. The slight increase can be attributed to the soil remediation efforts within the flood plain in the vicinity of CSMRI-5. The current value of 6.7 µg/l is still well below the MCL of 30 µg/l.

The concentration of uranium detected in CSMRI-8 decreased to 770 µg/l from a previous value of 1,200 µg/l. Monitor well CSMRI-8 was installed in February 2007, and quarterly monitoring will be continued to document seasonal variability and trends in the concentration of uranium at this location.

The groundwater at the CSMRI site will be monitored on a quarterly basis and the exceedances of uranium in monitoring wells CSMRI-4 and CSMRI-8 will continue to be evaluated as more data are made available. The relationship between the seasonal stream flow of Clear Creek and the exceedances of uranium for the monitor wells located on the flood plain will be assessed.

3.2.1 Comparison of Upgradient and Downgradient Groundwater Quality

Wells CSMRI-4, CSMRI-5, and CSMRI-8 are downgradient from the site and are located on the Clear Creek flood plain. Monitor wells CSMRI-7B and CSMRI-9 are located downgradient of the CSMRI site at the top of a topographical slope above the flood plain; and CSMRI-6B, CSMRI-10, and CSMRI-11 are upgradient from the site.

Metals concentrations that are above detection limits vary widely regarding upgradient versus downgradient wells. The analytical data indicate the influence of Clear Creek to CSMRI-1 where Ca was detected in SW-1, SW-2, and CSMRI-1 at concentrations of 35 mg/l, 35 mg/l, and

36 mg/l, respectively. Five monitor wells within the immediate CSMRI site detected Ca at concentrations narrowly ranging from 93 to 100 mg/l. However, the analytical results indicate the presence of Ca at a concentration of 210 mg/l in monitor well CSMRI-8, over twice the concentration of most of the other monitor wells. The same observation for elevated concentrations of K and Na in monitor well CSMRI-8 applies when compared to other monitor well analytical data.

Uranium was detected in monitor well CSMRI-4 at a concentration of 62 µg/l and in CSMRI-8 at a concentration of 770 µg/l, which exceed the MCL of 30 µg/l. As shown on Figure 5, until the last several rounds of sampling, there appeared to be a seasonal correlation between fluctuations of the water table elevation and the concentration of uranium in monitor well CSMRI-4. The recent slight rise in the concentration of uranium in CSMRI-4 will continue to be monitored to assess the variability of uranium in this monitor well and the interaction with the seasonal fluctuations of Clear Creek.

3.2.2 Comparison with Previous Groundwater Quality Analyses

Table 2-5 presents groundwater analytical results from past sampling events dating back to 1991 for radioisotopes of concern. The data indicate a slight decreasing trend in contaminant concentrations over time, indicating improving groundwater quality.

As additional data are collected and trends become more defined, graphs of concentration versus time will be produced and presented. This analytical data will be incorporated to show longer-term trends and correlation between the detected concentration of uranium in groundwater, the fluctuating water table, and seasonal variability if present.

3.2.3 Comparison with Colorado Groundwater Standards

The statewide dissolved concentration standard of 5 pCi/l for the sum of Ra-226 and Ra-228 in drinking water set by the State of Colorado Water Quality Control (WQC) Commission is not exceeded in any of the sampled monitoring wells. The statewide dissolved concentration standard for drinking water of 60 pCi/l for the sum of Th-230 and Th-232 was not exceeded in any of the sampled monitoring wells. No exceedances of the MCL for tested metals were identified in any of the groundwater and surface water samples.

The MCL for uranium in drinking water was exceeded in monitor wells CSMRI-4 at 62 µg/l and CSMRI-8 at 770 µg/l. In January 2008, CDPHE WQC Commission adopted the surface water quality standard of 30 µg/l as the groundwater quality standard in an effort to keep both uranium standards consistent. There was previously no groundwater quality standard; the 30 µg/l standard will be effective on May 31, 2008.

The spike in the concentration of uranium in CSMRI-4 shown in Figure 4 may be attributed to the increased precipitation during the months of December 2006 through February 2007. This monitor well exhibited the same trend in 2003 during a prolonged high precipitation time period and when the asphalt cover and buildings associated with CSMRI had been removed.

The detected concentration of 770 µg/l at monitoring well CSMRI-8 may be due to:

- The well contains residual uranium from the former pond area on the flood plain.

- Uranium was disturbed and introduced into the monitor well during installation.
- The well contains residual uranium from the former Building 101 area at the top of the slope above the flood plain.
- Uranium is naturally occurring in the Fox Hills bedrock formation.
- The well is located in a zone where strong mixing between Clear Creek water and groundwater occurs, and the oxidizing conditions associated with creek water causes uranium to dissolve more readily.

Monitoring well CSMRI-8 will continue to be sampled on a quarterly basis along with the other site wells, and the reason for the elevated level of uranium will be evaluated.

3.3 Surface Water Quality

Surface water samples are collected from two locations at the site. Location SW-1 is located upstream from the site and the second location, SW-2, is downstream from the site. The metals detected above their respective detection limits include: Ca, K, Mg, Na, and Zn. The upstream and downstream surface-water concentrations of all metals and radionuclides detected at the CSMRI site from stations SW-1 and SW-2 are similar. No established MCLs were exceeded.

4. Activities for Second Quarter 2008

Second quarter 2008 activities at the site include transferring the Stormwater Management permit to the Colorado School of Mines - Facilities Maintenance. The permit was issued by the City of Golden Stormwater Management Program. The permit will be transferred to a contractor during the construction of the proposed soccer field at the CSMRI site.

5. References

Colorado Department of Public Health and Environment, Water Quality Control Commission, Regulation No. 41, *The Basic Standards for Ground Water*. Amended: January 14, 2008, Effective: May 31, 2008.

New Horizons Environmental Consultants, Inc. Remedial Investigation/Feasibility Study and Proposed Plan, Colorado School of Mines Research Institute Site, Golden, CO, January 21, 2004.

Stoller, Final Site Characterization Work Plan, May 2006.

USGS Surface Water website: <http://nwis.waterdata.usgs.gov>

Table 2-1
Summary of Radioisotopes in Groundwater

Sample Station	Sample Date	Ra-226 (pCi/l)		Ra-228 (pCi/l)		Th-228 (pCi/l)		Th-230 (pCi/l)		Th-232 (pCi/l)		Total U (µg/l)
		Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result
CSMRI-1	4/18/08	-0.02	0.31	0.66	0.4	-0.03	0.053	-0.004	0.063	0.01	0.023	1.9
CSMRI-1B	4/18/08	0.03	0.15	0.72	0.46	-0.004	0.093	-0.046	0.056	0	0.025	6
CSMRI-2	4/17/08	1.08	0.43	1.89	0.67	0.041	0.058	-0.021	0.055	0.008	0.019	0.89
CSMRI-4	4/17/08	0.11	0.23	0.71	0.37	0.017	0.061	-0.019	0.052	0.002	0.017	62
CSMRI-5	4/17/08	1.37	0.53	0.64	0.4	0.068	0.078	0.029	0.065	0.017	0.02	6.7
CSMRI-6B	4/18/08	0.36	0.35	0.88	0.44	-0.005	0.053	-0.022	0.051	0.021	0.02	5
CSMRI-7B	4/15/08	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
CSMRI-8	4/17/08	0.39	0.26	0.71	0.47	-0.015	0.066	-0.053	0.05	0.009	0.02	770
CSMRI-9	4/15/08	0.27	0.22	0.65	0.43	-0.004	0.07	0.015	0.071	0.022	0.029	22
CSMRI-10	4/15/08	0.03	0.38	0.56	0.39	-0.006	0.07	-0.05	0.057	0.005	0.023	8.7
CSMRI-11	4/15/08	0.35	0.24	0.75	0.44	-0.032	0.076	0.004	0.058	0.016	0.024	7.6
MCL*		Total Ra = 5				NE		Th 230 + Th 232 = 60**				

*Maximum Contaminant Level – National Primary Drinking Water Regulations
 **5 CCR 1002-41 Reg 41 – Colorado Groundwater Standards
 NE - Not Established
 NT – Not Tested

Table 2-2
Summary of Metals in Groundwater
(All results in milligrams per liter)

Sample Station	Sample Date	Ag	As	Ba	Ca	Cd	Cr	Hg	K	Mg	Mo	Na	Pb	Se	V	Zn
CSMRI-1	4/18/08	ND	ND	0.081 (B)	36	ND	ND	ND	2.7	11	0.0015 (B)	22	ND	ND	ND	0.057
CSMRI-1B	4/18/08	ND	ND	0.11	93	ND	ND	ND	9.1	43	0.027	39	ND	ND	0.00065 (B)	ND
CSMRI-2	4/17/08	ND	ND	0.092 (B)	78	ND	ND	ND	6.6	36	ND	20	ND	ND	0.0014 (B)	0.0055 (B)
CSMRI-4	4/17/08	ND	0.0063 (B)	0.089 (B)	150	0.00047 (B)	ND	0.000016 (B)	10	66	0.014	53	ND	ND	0.00078 (B)	0.087
CSMRI-5	4/17/08	ND	ND	0.078 (B)	100	ND	ND	0.000018 (B)	4.6	40	0.0011 (B)	41	ND	ND	0.0011 (B)	0.093
CSMRI-6B	4/18/08	ND	ND	0.17	96	ND	ND	ND	6.1	40	0.0059 (B)	45	ND	ND	0.0013 (B)	0.0099 (B)
CSMRI-7B	DRY	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
CSMRI-8	4/17/08	ND	ND	0.046 (B)	210	ND	0.0011 (B)	ND	13	63	0.016	73	ND	ND	ND	0.032
CSMRI-9	4/15/08	ND	ND	0.077 (B)	100	ND	ND	0.000013 (B)	5	52	0.0017 (B)	46	ND	ND	0.00077 (B)	0.0079 (B)
CSMRI-10	4/15/08	ND	ND	0.088 (B)	100	ND	0.0044 (B)	ND	4.5	44	ND	40	ND	ND	0.00059 (B)	0.0018 (B)
CSMRI-11	4/15/08	ND	ND	0.12	100	ND	ND	ND	4.7	41	ND	44	ND	ND	ND	ND
Detection Limits		0.01	0.01	0.1	1	0.005	0.01	0.0002 (B)	1	1	0.01	1	0.003	0.005	0.01	0.02
MCL*		NE	0.010	2	NE	0.005	0.1	0.002 (B)	NE	NE	NE	NE	0.015	0.05	NE	NE

*Maximum Contaminant Level – National Primary Drinking Water Regulations
 ND – Non Detect
 NE – Not Established
 NT – Not Tested
 (B) – Detected above Instrument Detection Level but below Reported Detection Level

Table 2-3
Summary of Radioisotopes in Surface Water

Sample Station	Sample Date	Ra-226 (pCi/l)		Ra-228 (pCi/l)		Th-228 (pCi/l)		Th-230 (pCi/l)		Th-232 (pCi/l)		Total U (µg/l)
		Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result
SW-1	4/18/08	0.06	0.1	-0.07	0.37	-0.023	0.064	-0.026	0.057	0.012	0.021	1.9
SW-2	4/18/08	0.13	0.14	0.58	0.42	0.015	0.061	0.024	0.063	0.024	0.027	1.8
MCL*		Total Ra = 5				NE		Th 230 + Th 232 = 60**				30

*Maximum Contaminant Level – National Primary Drinking Water Regulations

**5 CCR 1002-31 Reg 31 – Colorado Surface Water Standards

NE – Not Established

Table 2-4
Summary of Metals in Surface Water
(All results in milligrams per liter)

Sample Station	Sample Date	Ag	As	Ba	Ca	Cd	Cr	Hg	K	Mg	Mo	Na	Pb	Se	V	Zn
SW-1	4/18/08	ND	ND	0.044 (B)	35	0.00044 (B)	ND	ND	3.4	9	0.0034 (B)	23	ND	ND	ND	0.13
SW-2	4/18/08	ND	ND	0.045 (B)	35	0.0005 (B)	ND	ND	3.4	9.1	0.0031 (B)	23	ND	ND	ND	0.14
Detection Limits		0.01	0.01	0.1	1	0.005	0.01	0.0002	1	1	0.01	1	0.003	0.005	0.01	0.02
MCLs*		0.01	0.010	2	NE	0.005	0.1	0.002	NE	NE	NE	NE	0.015	0.05	NE	NE

*Maximum Contaminant Level – National Primary Drinking Water Regulations

ND – Non Detect

NE – Not Established

(B) – Detected above Instrument Detection Level but below Reported Detection Level

Table 2-5
CSMRI Historical Groundwater Data (Previous Consultants)
(All results in picoCuries per liter)

Well ID (d)	Analyte	1/1991 (a)	6/1991 (a)	3/1999 (b)	6/1999 (b)	6/1999 (b)	10/1999 (b)	2/2003 (c)	4/2003 (c)	7/2003 (c)	10/2003 (c)
CSMRI-1	Ra-226			0.1	0.3	0.3	0.2	<0.55	<0.45	ND (<0.38)	ND (<0.31)
	U Total			2.09	2.59	2.59	1.44	2.4	2.9	0.87	1.4
	Th-230			0.4	0.2	0.2	0.2	<0.19	0.21	ND (<0.13)	<0.15
CSMRI-2	Ra-226		1.9	1.9	1.4	1.4	1.4	1.4	2.8	2.1	1.7
	U Total	11	5.7	0.55	1.46	1.46	0.71	1.5	1.3	1.9	1.3
	Th-230		0	0.1	0.1	0.1	0.9	<0.17	0.43	0.20	0.31
CSMRI-3	Ra-226		0.6	1.5	1.2	1.2	1.6	<0.75	<0.81	ND (<0.49)	<0.98
	U Total	17	10.4	8.41	12.4	12.4	10	12	12	9	10
	Th-230		0	0.3	0.3	0.3	1.1	<0.12	ND (<0.15)	ND (<0.17)	ND (<0.14)
CSMRI-4	Ra-226		1	<0.4	0.6	0.6	0.4	<0.85	<0.42	<0.32	ND (<0.64)
	U Total	86	57.3	23.4	58.6	58.6	33.7	16	34.2	53	19
	Th-230		0	0.7	0.3	0.3	0.4	<0.099	ND (<0.15)	ND (<0.17)	ND (<0.12)
CSMRI-5	Ra-226		0.6	2.4	3.3	3.3	2.7	ND (<0.49)	1.1	2.6	1.59
	U Total	14	16.8	3.6	3.6	3.6	4	2.8	2.3	2.7	3.3
	Th-230		0	0.2	0.2	0.2	1.4	0.062	ND (<0.14)	ND (<0.19)	ND (<0.13)

Notes: ND = Not Detected

a - Samples collected by Grant and Associates and analyzed by Barringer Labs

b - Samples collected by URS Greiner Woodward Clyde and analyzed by CORE Labs

c - Samples collected by New Horizons Environmental Consultants and analyzed by Paragon Analytics; Total U activity (pCi/l) calculated from concentration (µg/l) reported by Paragon.

d - Well Identification numbers changed from the 1991 data to the 1999 data. Data presented account for this change

**Table 2-6
Historical Summary of Radioisotopes in Groundwater (Stoller)**

Sample Station	Sample Date	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	U-234 (pCi/l)	U-235 (pCi/l)	U-238 (pCi/l)	Total U (µg/l)
CSMRI-1	2/25/05	-0.11	0.81	0.007	0.07	0.01	0.77	0.043	0.53	1.61
	6/14/05	0.16	0.44	0.018	-0.021	0.012	0.43	0.011	0.217	0.64
	9/7/05	0.1	0.63	0.068	0.167	0.114	0.85	0.053	0.43	1.3
	12/20/05	-0.19	0.59	-0.045	0.32	0.014	0.94	0.073	0.46	1.41
	3/15/06	-0.15	0.58	0.025	0.032	-0.004	1.76	0.11	0.92	2.8
	6/14/06	0.42	0.05	0.15	-0.06	0.062	0.18	0.18	0.08	0.31
	9/13/06	0.25	0.34	0.11	-0.079	0.027	0.45	0.051	0.25	0.77
	3/1/07	0.32	0.78	0.052	-0.031	0.012	NT	NT	NT	1.2
	6/27/07	0.51	0.91	0.17	0.064	-0.005	NT	NT	NT	0.88
	9/11/07	-0.3	0.53	-0.031	0.019	0.001	NT	NT	NT	0.72
	11/27/07	-0.2	0.72	0.71	0.101	0.02	NT	NT	NT	1.2
2/27/08	0.2	0.85	0.035	0.032	0.011	NT	NT	NT	1.5	
CSMRI-1B	3/8/07	0.13	1.19	-0.03	-0.09	0.02	NT	NT	NT	2.7
	6/26/07	0.09	0.3	0.001	0.002	0.012	NT	NT	NT	5
	9/11/07	-0.13	0.65	0.019	0.012	0.001	NT	NT	NT	6.3
	11/27/07	0.11	1.16	0.004	0.06	0.016	NT	NT	NT	6.9
	2/28/08	0.32	0.61	0.01	0.058	0.033	NT	NT	NT	6.5
CSMRI-2	2/25/05	0.8	1.85	0.07	-0.02	0.01	0.6	0.05	0.16	0.53
	6/14/05	1.47	3.0	0.14	0.003	0.026	0.68	0.025	0.299	0.89
	9/7/05	1.78	2.71	0.162	0.108	0.049	0.65	0.050	0.31	0.94
	12/20/05	1.35	1.62	0.108	0.285	0.024	0.83	0.002	0.35	1.06
	3/15/06	1.25	2.53	0.03	0.204	0.012	0.83	0.066	0.45	1.36
	6/14/06	0.99	1.79	0.25	0.22	0.049	0.69	0.04	0.25	0.76
	9/13/06	1.01	2.35	0.088	-0.039	-0.008	0.46	0.014	0.28	0.85
	3/8/07	0.76	2.15	0.022	-0.01	0.011	NT	NT	NT	0.72
	6/28/07	1.4	3.2	-0.075	-0.01	-0.007	NT	NT	NT	2
	9/11/07	0.78	3.2	0.016	0.101	0.014	NT	NT	NT	0.98
	11/27/07	0.45	2.05	0.037	0.035	0.006	NT	NT	NT	1
2/28/08	1.37	2.26	0.043	0.085	0.044	NT	NT	NT	0.68	
CSMRI-4	2/25/05	-0.03	0.16	0.019	-0.009	0.013	9.7	0.53	8.2	24.7
	6/14/05	0.26	0.34	0.013	0.014	0.005	11.4	0.49	10.6	31.4
	9/7/05	0.17	0.78	-0.013	0.164	0.086	6.4	0.33	6.4	19.3
	12/20/05	0.13	0.1	0.033	0.311	0.012	11.5	0.61	11.4	34.3
	3/15/06	0	0.38	0.004	0.174	0.007	9	0.43	9	27.1
	6/15/06	0.41	0.39	0.11	0.17	0.061	9.2	0.4	8.9	26.8
	9/13/06	-0.05	0.79	0.056	-0.015	0.007	6.5	0.35	6	17.9
	3/8/07	0.09	0.37	-0.034	-0.037	0.013	NT	NT	NT	48
	6/27/07	0.07	0.87	0.011	0.035	0.004	NT	NT	NT	66
	9/11/07	0.99	1.12	0.024	0.112	0.021	NT	NT	NT	49
	11/26/07	0.33	0.73	0.029	0.149	0.016	NT	NT	NT	48

**Table 2-6
Historical Summary of Radioisotopes in Groundwater (Stoller)**

Sample Station	Sample Date	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	U-234 (pCi/l)	U-235 (pCi/l)	U-238 (pCi/l)	Total U (µg/l)
	2/27/08	0.24	0.78	0.011	0.038	0.014	NT	NT	NT	58
CSMRI-5	2/25/05	1.06	0.53	0.009	0.007	0.034	1.22	0.056	0.93	2.8
	6/14/05	2.51	0.44	-0.018	0.039	0.011	1.51	0.086	1.2	3.57
	9/7/05	2.50	0.76	0.06	1.25	0.051	1.85	0.051	1.47	4.4
	12/20/05	1.97	0.52	0.032	0.126	0.01	1.45	0.066	1.21	3.63
	3/15/06	0.57	0.45	0.038	0.144	0.019	1.81	0.058	1.38	4.1
	6/15/06	2.13	0.87	0.145	0.08	0.043	1.03	0.13	0.92	2.8
	9/13/06	2.29	0.56	0.053	-0.053	0.005	3.18	0.17	2.32	7
	3/8/07	1.78	0.39	-0.012	-0.061	0	NT	NT	NT	5.8
	6/27/07	2.22	0.86	0.008	-0.023	0.013	NT	NT	NT	10
	9/11/07	1.91	1.2	0.091	0.003	0.006	NT	NT	NT	11
	11/26/07	1.52	0.49	0.004	-0.008	0.01	NT	NT	NT	6.6
2/27/08	1.05	0.17	-0.011	0.02	0.051	NT	NT	NT	6.6	
CSMRI-6B	2/27/07	NT	NT	NT	NT	NT	NT	NT	NT	NT
	6/26/07	0.46	0.63	-0.009	-0.006	0.024	NT	NT	NT	17
	9/10/07	0.15	0.91	0.046	0.025	0.023	NT	NT	NT	11
	11/27/07	-0.02	0.77	-0.002	0.069	0.004	NT	NT	NT	8.2
	2/28/08	0.26	1	-0.009	0.022	0.022	NT	NT	NT	4.7
CSMRI-7B	2/27/07	NT	NT	NT	NT	NT	NT	NT	NT	NT
	6/26/07	0.65	0.22	0.036	0.054	0.027	NT	NT	NT	68
	9/10/07	NT	NT	NT	NT	NT	NT	NT	NT	NT
	--	NT	NT	NT	NT	NT	NT	NT	NT	NT
	--	NT	NT	NT	NT	NT	NT	NT	NT	NT
CSMRI-8	3/8/07	0.7	1.06	0.072	-0.031	0.016	NT	NT	NT	1,100
	6/27/07	0.8	0.4	0.039	0.046	0.008	NT	NT	NT	810
	9/10/07	1.31	0.9	0.031	0.05	0.009	NT	NT	NT	630
	11/27/07	1.27	1.2	-0.02	0.074	-0.003	NT	NT	NT	1300
	2/27/08	1.19	1.38	0.089	0.1	0.043	NT	NT	NT	1,200
CSMRI-9	2/27/07	0.12	0.53	-0.017	0.04	0.027	NT	NT	NT	7.9
	6/26/07	0.22	0.37	0.018	0.004	-0.015	NT	NT	NT	32
	9/10/07	0.5	1.01	0.04	-0.043	0.012	NT	NT	NT	35
	11/26/07	0.25	0.27	0.023	0.003	0.003	NT	NT	NT	28
	2/27/08	0.11	0.24	0.047	0.037	0.041	NT	NT	NT	24
CSMRI-10	3/1/07	0.19	0.63	0.014	-0.004	0.018	NT	NT	NT	7.8
	6/26/07	0.26	0.43	-0.008	0.03	-0.005	NT	NT	NT	8.8
	9/10/07	-0.04	0.48	0.103	0.05	0.005	NT	NT	NT	9.9
	11/26/07	-0.05	0.57	0.068	0.141	0.031	NT	NT	NT	10
	2/26/08	0.12	0.44	0.094	0.011	0.019	NT	NT	NT	9.2
CSMRI-11	3/1/07	0.16	0.46	0.051	0.085	0.007	NT	NT	NT	4.8
	6/26/07	0.37	0.43	0.084	0	0.008	NT	NT	NT	8.4

Table 2-6
Historical Summary of Radioisotopes in Groundwater (Stoller)

Sample Station	Sample Date	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	U-234 (pCi/l)	U-235 (pCi/l)	U-238 (pCi/l)	Total U (µg/l)
	9/10/07	-0.26	0.52	0.012	0.006	0.016	NT	NT	NT	10
	11/26/07	0.16	0.87	0.089	0.099	-0.012	NT	NT	NT	11
	2/26/08	0.28	-0.03	0.044	0.044	0.074	NT	NT	NT	8.7
MCL*		Total Ra = 5		NE	Th 230 + Th 232 = 60**		NE	NE	NE	30

*Maximum Contaminant Level – National Primary Drinking Water Regulations

**5 CCR 1002-41 Reg 41 – Colorado Groundwater Standards

pCi/l - picocuries per liter

NE – Not Established

NT – not tested

µg/l – micrograms per liter

Table 2-7
Historical Summary of Metals in Groundwater (Stoller)
(All results in milligrams per liter)

Sample Station	Sample Date	Ag	As	Ba	Ca	Cd	Cr	Hg	K	Mg	Mo	Na	Pb	Se	V	Zn
CSMRI-1	2/25/05	ND	ND	ND	28	ND	ND	ND	2.8	9.4	ND	29	ND	ND	ND	0.032
	6/14/05	ND	ND	ND	17	ND	ND	ND	2.3	5.1	ND	16	ND	ND	ND	0.032
	9/7/05	ND	ND	0.055 (B)	21	ND	ND	ND	2.9	6.3	0.0021 (B)	25	ND	0.0041 (B)	ND	.034
	12/20/05	ND	ND	0.067 (B)	32	ND	ND	0.000034 (B)	2.9	10	ND	26	ND	ND	ND	0.052
	3/15/06	ND	ND	0.064 (B)	33	ND	ND	0.00002 (B)	2.6	10	0.0013 (B)	24	ND	ND	ND	0.049
	6/14/06	ND	ND	0.031 (B)	10	ND	ND	ND	1.9	3	0.0051 (B)	9.2	ND	0.0035 (B)	ND	0.015 (B)
	9/13/06	ND	ND	0.061 (B)	20	ND	0.041 (B)	ND	2.7	6	0.0038 (B)	14	ND	ND	ND	0.03
	3/1/07	ND	ND	0.081 (B)	39	0.00045 (B)	0.00063 (B)	0.000017 (B)	3	12	0.0059 (B)	26	ND	0.0066	ND	0.048
	6/27/07	ND	ND	0.063 (B)	23	ND	ND	0.0000073 (B)	2.4	9	ND	21	ND	ND	ND	0.017 (B)
	9/11/07	ND	ND	0.065 (B)	23	ND	0.00061 (B)	0.000011 (B)	2.5	7.2	0.002 (B)	14	ND	ND	ND	0.038
	11/27/07	ND	ND	0.075 (B)	31	ND	ND	0.000029 (B)	2.5	9.7	0.0014 (B)	18	ND	ND	ND	0.049
2/27/08	ND	ND	0.08 (B)	36	ND	ND	ND	2.5	12	0.0013 (B)	22	ND	ND	ND	0.048	
CSMRI-1B	3/1/07	ND	ND	0.098 (B)	130	ND	0.00014 (B)	0.000017 (B)	52	47	0.17	91	ND	0.0058	0.0009 (B)	ND
	6/26/07	ND	ND	0.071 (B)	83	ND	ND	0.0000072 (B)	10	38	0.029	35	ND	ND	ND	ND
	9/11/07	ND	ND	0.1	93	ND	ND	0.0000094 (B)	8.4	43	0.031	36	ND	ND	ND	0.0012 (B)
	11/27/07	ND	ND	0.11	100	ND	ND	0.000029 (B)	9.4	46	0.024	42	ND	ND	0.00073 (B)	0.0039 (B)
	2/28/08	ND	ND	0.11	97	ND	0.0015 (B)	ND	9.3	45	0.029	41	ND	0.0039 (B)	ND	0.0033 (B)
CSMRI-2	2/25/05	ND	ND	0.11	72	ND	ND	ND	7.1	32	ND	19	ND	ND	ND	0.02
	6/14/05	ND	ND	0.1	76	ND	ND	ND	6.3	32	ND	18	ND	ND	ND	ND
	9/7/05	ND	ND	0.11	81	ND	ND	ND	7.1	35	ND	19	ND	ND	ND	0.011 (B)
	12/20/05	ND	ND	0.098 (B)	76	ND	ND	0.000031 (B)	6.7	33	ND	18	ND	ND	ND	0.0043 (B)
	3/15/06	ND	ND	0.09 (B)	74	ND	ND	0.000023 (B)	6.1	31	ND	17	ND	ND	ND	0.0059 (B)
	6/14/06	ND	ND	0.093 (B)	70	ND	ND	ND	6.3	31	0.0048 (B)	17	ND	0.0031 (B)	ND	0.0092 (B)
	9/13/06	ND	ND	0.11	81	ND	ND	ND	6.7	35	0.0014 (B)	19	ND	ND	ND	0.0092 (B)
	3/8/07	ND	0.0058 (B)	0.12	88	ND	ND	ND	8.3	39	ND	21	ND	0.03	ND	0.0011 (B)
	6/28/07	ND	ND	0.11	97	ND	ND	0.0000056 (B)	7.9	49	ND	26	ND	ND	0.002 (B)	0.0041 (B)
	9/11/07	ND	ND	0.1	91	ND	ND	0.000016 (B)	7.2	43	ND	23	ND	ND	0.00086 (B)	0.0082 (B)
	11/27/07	ND	ND	0.093 (B)	83	ND	ND	0.000023 (B)	7	38	ND	22	ND	ND	0.001 (B)	0.0075 (B)
2/28/08	ND	ND	0.094 (B)	81	ND	0.0018 (B)	ND	6.6	38	ND	21	ND	ND	0.0017 (B)	0.0073 (B)	
CSMRI-4	2/25/05	ND	ND	ND	72	ND	ND	ND	5.1	31	0.017	29	ND	ND	ND	0.12
	6/14/05	ND	ND	ND	86	ND	ND	ND	6.6	34	0.038	34	ND	0.0063	ND	0.068
	9/7/05	ND	0.0035 (B)	0.055 (B)	82	ND	ND	ND	7.6	33	0.035	31	ND	0.0049 (B)	ND	0.097
	12/20/05	ND	ND	0.056 (B)	100	ND	ND	0.000045 (B)	6.8	43	0.024	34	ND	ND	ND	0.18
	3/15/06	ND	ND	0.042 (B)	81	ND	ND	0.000034 (B)	5	35	0.021	29	ND	ND	0.00056 (B)	0.21
	6/15/06	ND	0.0031 (B)	0.055 (B)	89	0.00085 (B)	ND	0.0000049 (B)	8.3	37	0.03	31	ND	ND	0.0011 (B)	0.11
	9/13/06	ND	ND	0.043 (B)	66	ND	ND	0.000016 (B)	8.3	27	0.038	30	ND	ND	ND	0.082
	3/8/07	ND	0.0057 (B)	0.072 (B)	120	0.00023 (B)	ND	0.000018 (B)	11	49	0.015	47	ND	0.019	ND	0.088
	6/27/07	ND	ND	0.067 (B)	110	ND	ND	0.000022 (B)	11	46	0.04	47	ND	ND	0.00073 (B)	0.14
	9/11/07	ND	0.0045 (B)	0.089 (B)	120	0.0011 (B)	0.0014 (B)	0.000037 (B)	12	49	0.05	41	ND	ND	0.0012 (B)	0.17
	11/26/07	ND	ND	0.081 (B)	110	0.00049 (B)	ND	0.000035 (B)	10	50	0.024	43	ND	ND	0.0011 (B)	0.1

Table 2-7
Historical Summary of Metals in Groundwater (Stoller)
(All results in milligrams per liter)

Sample Station	Sample Date	Ag	As	Ba	Ca	Cd	Cr	Hg	K	Mg	Mo	Na	Pb	Se	V	Zn
	2/27/08	ND	ND	0.073 (B)	130	ND	ND	0.000016 (B)	8.2	58	0.015	45	ND	0.0034 (B)	ND	0.069
CSMRI-5	2/25/05	ND	ND	ND	54	ND	ND	ND	3.4	22	ND	27	ND	ND	ND	0.067
	6/14/05	ND	ND	ND	63	ND	ND	ND	3.3	23	ND	28	ND	ND	ND	0.047
	9/7/05	ND	ND	0.085 (B)	85	ND	ND	ND	4.2	31	0.0042 (B)	35	ND	0.0037 (B)	0.0018 (B)	0.089
	12/20/05	ND	ND	0.072 (B)	79	0.00071 (B)	ND	0.000048 (B)	4.1	30	0.002 (B)	31	ND	ND	0.0012 (B)	0.17
	3/15/06	ND	ND	0.058 (B)	70	0.00037 (B)	ND	0.000029 (B)	3.5	26	0.0031 (B)	29	ND	0.0035 (B)	0.00067 (B)	0.11
	6/15/06	ND	ND	0.052 (B)	51	ND	ND	0.000012 (B)	3.6	19	0.0028 (B)	26	ND	ND	ND	0.055
	9/13/06	ND	ND	0.087 (B)	110	ND	0.0022 (B)	ND	4.5	41	0.0027 (B)	50	ND	ND	0.001 (B)	0.11
	3/8/07	ND	0.0037 (B)	0.063 (B)	80	ND	ND	ND	4.5	31	0.0019 (B)	34	ND	0.015	ND	0.083
	6/27/07	ND	ND	0.066 (B)	98	ND	ND	0.0000091 (B)	4.5	40	0.006 (B)	40	ND	ND	0.0017 (B)	0.025
	9/11/07	ND	ND	0.13	110	ND	0.00082 (B)	0.000023 (B)	4.9	44	0.0042 (B)	47	ND	ND	0.0015 (B)	0.054
	11/26/07	ND	ND	0.087 (B)	110	ND	0.00089 (B)	0.000032 (B)	4.5	42	ND	47	ND	ND	0.0012 (B)	0.12
	2/27/08	ND	ND	0.073 (B)	100	ND	ND	ND	4.3	40	ND	42	ND	ND	ND	0.094
CSMRI-6B	2/27/08	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	6/26/07	ND	ND	0.12	100	ND	ND	0.0000059 (B)	5.9	56	0.004 (B)	41	ND	ND	ND	ND
	9/10/07	ND	0.0046 (B)	0.15	110	ND	0.00088 (B)	0.000013 (B)	4.8	48	0.0022 (B)	46	ND	ND	0.00081 (B)	0.0051 (B)
	11/27/07	ND	0.0048 (B)	0.17	110	ND	ND	0.000025 (B)	6	49	0.0028 (B)	57	ND	0.0051	0.00066 (B)	ND
	2/28/08	ND	ND	0.17	100	ND	ND	ND	5.8	43	0.004 (B)	49	ND	ND	ND	0.0048
CSMRI-7B	2/27/07	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	6/26/07	ND	ND	0.056 (B)	70	ND	ND	0.000006 (B)	5.5	37	0.024	53	ND	ND	0.00061 (B)	0.0041 (B)
	9/10/07	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	--	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	2/27/08	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
CSMRI-8	3/8/07	ND	0.0053 (B)	0.068 (B)	230	ND	ND	ND	23	72	0.094	74	ND	0.034	ND	0.0024 (B)
	6/27/07	ND	ND	0.053 (B)	190	ND	ND	0.0000099 (B)	19	55	0.043	52	ND	ND	ND	0.069
	9/10/07	ND	0.0069 (B)	0.076 (B)	160	ND	0.00074 (B)	0.000027 (B)	15	49	0.034	54	0.0018 (B)	ND	ND	0.025
	11/27/07	ND	ND	0.091 (B)	230	ND	ND	0.000024 (B)	15	67	0.026	70	ND	0.0046 (B)	0.001 (B)	0.011 (B)
	2/27/08	ND	0.036 (B)	0.07 (B)	270	ND	ND	ND	15	82	0.019	100	ND	ND	ND	0.038
CSMRI-9	2/27/07	ND	ND	0.08 (B)	69	ND	0.0011 (B)	0.000024 (B)	12	31	0.045	33	ND	0.011	0.001 (B)	ND
	6/26/07	ND	ND	0.049 (B)	160	ND	ND	0.000002 (B)	8.5	77	0.0028	150	ND	0.0049 (B)	0.00096 (B)	0.0096 (B)
	9/10/07	ND	0.004 (B)	0.059 (B)	100	ND	0.0009 (B)	0.000016 (B)	6	51	0.0037 (B)	49	ND	ND	0.00071 (B)	0.0097 (B)
	11/26/07	ND	ND	0.078 (B)	110	0.00051 (B)	0.0011 (B)	0.000031 (B)	5.9	56	0.0023 (B)	52	ND	0.0054	0.0012 (B)	0.015 (B)
	2/27/08	ND	ND	0.079 (B)	110	ND	ND	ND	5.4	56	ND	49	ND	0.0033 (B)	ND	0.011
CSMRI-10	3/1/07	0.00051 (B)	ND	0.064 (B)	79	ND	0.0013 (B)	0.000024 (B)	7.3	33	0.01	36	ND	0.01	0.0011 (B)	ND
	6/26/07	ND	ND	0.079 (B)	100	ND	ND	0.0000063 (B)	4.7	44	ND	37	ND	0.0044 (B)	0.00055 (B)	ND
	9/10/07	ND	0.0039 (B)	0.071 (B)	89	ND	0.0012 (B)	0.00002 (B)	4.2	38	0.0014 (B)	36	ND	ND	0.00099 (B)	0.0042 (B)
	11/26/07	ND	ND	0.085 (B)	110	ND	ND	0.000026 (B)	4.7	43	ND	41	ND	ND	ND	ND
	2/26/08	ND	ND	0.09 (B)	110	ND	ND	ND	4.6	46	ND	41	ND	ND	ND	0.0052
CSMRI-11	2/27/07	ND	ND	0.073 (B)	75	ND	0.00013 (B)	0.000023 (B)	9.7	29	0.033	33	ND	0.013	0.00073 (B)	0.0023 (B)

Table 2-7
Historical Summary of Metals in Groundwater (Stoller)
(All results in milligrams per liter)

Sample Station	Sample Date	Ag	As	Ba	Ca	Cd	Cr	Hg	K	Mg	Mo	Na	Pb	Se	V	Zn
	6/26/07	ND	ND	0.096 (B)	110	ND	0.0012 (B)	0.0000071 (B)	5.4	44	0.0014 (B)	39	ND	0.0064	0.00059 (B)	ND
	9/10/07	ND	0.004 (B)	0.071 (B)	96	ND	0.00083 (B)	0.000016 (B)	4.5	39	0.0016 (B)	44	ND	ND	0.00078(B)	0.0033 (B)
	11/26/07	ND	ND	0.11	110	ND	ND	0.000028 (B)	4.9	44	0.0012 (B)	40	ND	ND	0.0013 (B)	ND
	2/26/08	ND	ND	0.11	110	ND	ND	ND	4.6	42	ND	44	ND	ND	ND	0.0048
Detection Limits		0.01	0.01	0.1	1	0.005	0.01	0.0002	1	1	0.01	1	0.003	0.005	0.01	0.02
MCL*		NE	0.01	2	NE	0.005	0.1	0.002	NE	NE	NE	NE	0.015	0.05	NE	NE

*Maximum Contaminant Level – National Primary Drinking Water Regulations

ND – non detect

NE – not established

NT – not tested

(B) – Detected above Instrument Detection Level but below Reported Detection Level

**Table 2-8
Historical Summary of Radioisotopes in Surface Water (Stoller)**

Sample Station	Sample Date	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	U-234 (pCi/l)	U-235 (pCi/l)	U-238 (pCi/l)	Total U (µg/l)
SW-1	2/25/05	0	0.58	0.018	-0.026	-0.001	0.89	0.083	0.65	1.97
	6/14/05	0.14	0.05	0.05	-0.025	0.016	0.246	0.021	0.251	0.75
	9/7/05	0.18	0.42	0.041	0.25	0.102	0.35	0.031	0.35	1.04
	12/20/05	-0.31	0.47	0.028	0.197	-0.005	0.64	0.041	0.7	2.11
	3/15/06	-0.16	0.35	0.059	0.125	0.005	0.6	0.029	0.53	1.59
	6/14/06	0.13	0.45	0.16	0.53	0.062	0.11	0.08	0.19	0.61
	9/13/06	-0.03	0.25	-0.019	-0.035	0.01	0.37	-0.005	0.34	1
	3/1/07	-0.1	0.25	-0.038	0.15	0.026	NT	NT	NT	1.7
	6/27/07	0.13	0.77	0.006	0.016	0.014	NT	NT	NT	0.6
	9/11/07	0.15	0.74	0.063	0.088	0.012	NT	NT	NT	0.94
	11/27/07	0.2	0.24	0.026	0.049	0.025	NT	NT	NT	1.8
	2/27/08	0.1	0.48	0.014	0.002	0.024	NT	NT	NT	2
SW-2	2/25/05	0.45	0.06	0.011	-0.016	0.033	0.8	0.066	0.42	1.29
	6/14/05	0.04	0.29	0.071	-0.028	0.007	0.259	0.032	0.23	0.69
	9/7/05	-0.08	0.24	-0.013	0.107	0.051	0.54	0.014	0.54	1.62
	12/20/05	0.09	0.07	-0.003	0.126	0	0.71	0.067	0.49	1.5
	3/15/06	-0.04	-0.15	0.009	0.184	0.01	0.79	0.004	0.51	1.52
	6/14/06	0.03	0.04	0.172	0.24	0.1	0.39	0	0.48	1.44
	9/13/06	0.11	0.35	0.009	-0.03	0.01	0.43	-0.006	0.3	0.89
	3/8/07	0.12	0.73	0.047	-0.055	0	NT	NT	NT	1.7
	6/28/07	0.02	0.78	0.028	0.014	0	NT	NT	NT	0.57
	9/11/07	0.1	0.27	0.066	0.068	0.002	NT	NT	NT	0.97
	11/26/07	0.11	0.36	0.007	0	0.012	NT	NT	NT	1.7
	2/26/08	0.1	0	-0.01	0.113	0.011	NT	NT	NT	2
MCL*		Total Ra = 5		NE	Th 230 + Th 232 = 60**		NE	NE	NE	30

*Maximum Contaminant Level – National Primary Drinking Water Regulations

**5 CCR 1002-31 Reg 31 – Colorado Surface Water Standards

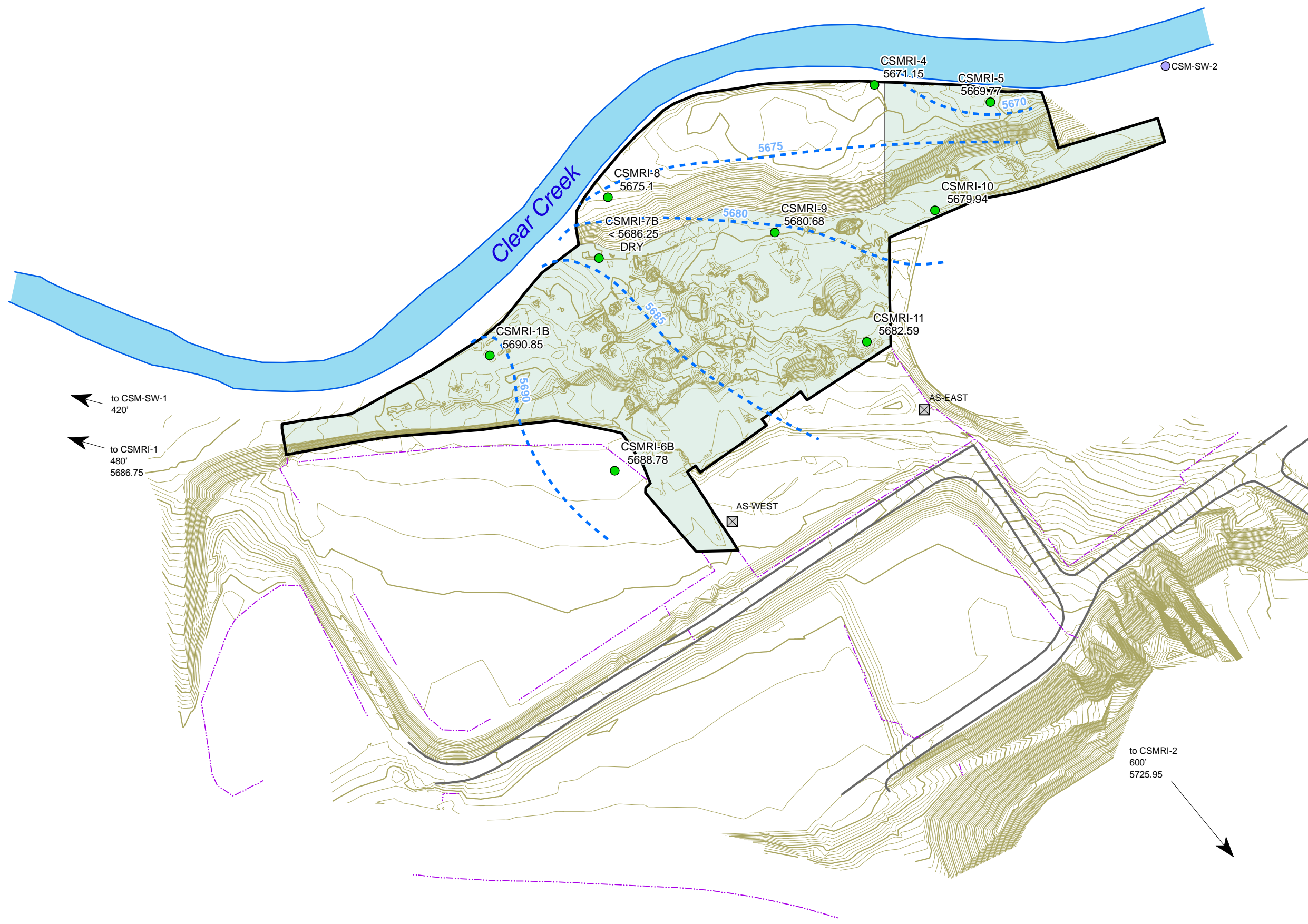
pCi/l - picoCuries per liter

µg/l – micrograms per liter

Table 2-9
Historical Summary of Metals in Surface Water (Stoller)
(All results in milligrams per liter)

Sample Station	Sample Date	Ag	As	Ba	Ca	Cd	Cr	Hg	K	Mg	Mo	Na	Pb	Se	V	Zn
SW-1	2/25/05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2
	6/14/05	ND	ND	ND	11	ND	ND	ND	1.1	2.8	ND	5.2	ND	ND	ND	0.09
	9/7/05	ND	0.0037 (B)	0.029 (B)	20	ND	ND	ND	2.2	4.4	0.0044 (B)	8.5	ND	0.0045 (B)	ND	0.063
	12/20/05	ND	ND	0.042 (B)	35	0.00057 (B)	ND	0.000034 (B)	3.7	7.6	0.004 (B)	19	ND	ND	ND	0.22
	3/15/06	ND	ND	0.04 (B)	37	0.00084 (B)	0.00047 (B)	0.000024 (B)	3.7	8.5	0.0048 (B)	23	ND	ND	0.00067 (B)	0.19
	6/14/06	0.0012 (B)	0.0032 (B)	0.011 (B)	8.2	ND	ND	ND	1	1.9	0.0042 (B)	3.1	ND	ND	ND	0.029
	9/13/06	ND	ND	0.03 (B)	21	ND	ND	ND	2.1	4.4	0.0049 (B)	8.6	ND	ND	ND	0.053
	3/1/07	ND	ND	0.049 (B)	44	0.0011 (B)	0.00092 (B)	0.000023 (B)	4.3	11	0.0046 (B)	26	ND	ND	ND	0.22
	6/27/07	ND	ND	0.018 (B)	10	ND	ND	0.0000068 (B)	0.93 (B)	2.5	0.0017 (B)	3.2	ND	ND	ND	0.067
	9/11/07	ND	ND	0.032 (B)	21	ND	ND	0.000019	1.7	5	0.0029 (B)	7.4	ND	ND	ND	0.078
	11/27/07	ND	ND	0.042 (B)	33	0.00076 (B)	ND	0.00027 (B)	2.8	8.2	0.0032 (B)	15	ND	ND	ND	0.18
2/27/08	ND	ND	0.042 (B)	36	ND	ND	ND	3.3	9.6	0.0022 (B)	19	ND	ND	ND	0.15	
SW-2	2/25/05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17
	6/14/05	ND	ND	ND	11	ND	ND	ND	1.1	2.8	ND	4.8	ND	ND	ND	0.085
	9/7/05	ND	ND	0.028 (B)	20	ND	ND	ND	2.1	4.4	0.0037 (B)	8.7	ND	0.0037 (B)	ND	0.051
	12/20/05	ND	ND	0.042 (B)	35	0.00043 (B)	ND	0.000034 (B)	3.8	8	0.0038 (B)	19	ND	ND	ND	0.21
	3/15/06	ND	ND	0.042 (B)	39	0.00053 (B)	0.00055 (B)	0.000022 (B)	3.8	8.9	0.0046 (B)	25	ND	ND	0.00053 (B)	0.2
	6/14/06	ND	0.0022 (B)	0.011 (B)	8.4	ND	ND	ND	1	1.9	0.0045 (B)	3	ND	ND	ND	0.031
	9/13/06	ND	ND	0.03 (B)	21	ND	ND	ND	2.1	4.4	0.0048 (B)	8.5	ND	ND	ND	0.04
	3/8/07	ND	0.0053 (B)	0.049 (B)	39	0.00064 (B)	ND	ND	4.2	9.8	0.0014 (B)	22	ND	ND	ND	0.17
	6/28/07	ND	ND	0.019 (B)	10	ND	ND	0.0000056 (B)	0.93 (B)	2.6	ND	3.3	ND	ND	ND	0.075
	9/11/07	ND	ND	0.033 (B)	21	ND	ND	0.00001	1.7	5.1	0.0035 (B)	7.5	ND	ND	ND	0.084
	11/26/07	ND	ND	0.044 (B)	35	0.0005 (B)	ND	0.00027 (B)	2.9	8.6	0.0027 (B)	15	ND	ND	ND	0.19
2/26/08	ND	ND	0.051	35	0.0005 (B)	ND	ND	3.1	9.2	0.0023 (B)	21	ND	ND	ND	0.15	
Detection Limits		0.01	0.01	0.1	1	0.005	0.01	0.0002	1	1	0.01	1	0.003	0.005	0.01	0.02
MCL*		0.01	0.01	2	NE	0.005	0.1	0.002	NE	NE	NE	NE	0.015	0.05	NE	NE

*Maximum Contaminant Level – National Primary Drinking Water Regulations
 ND – Non Detect
 NE – Not Established
 (B) – Detected above Instrument Detection Level but below Reported Detection Level



- ### Explanation
- Well
 - Air Sample Station
 - Surface Water Sample Location
 - - - Potentiometric Surface Contours (5 Ft.)
 - CSMRI Creekside Site
 - - - Fences
 - Roads
 - Topography (5 ft Intervals)
 - Topography (1 ft Intervals)
 - Site Areas

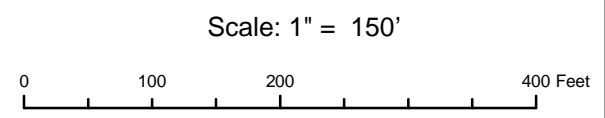
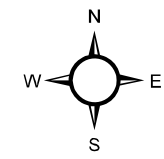


Figure 1
Groundwater Potentiometric Surface Map - April 2008

CSMRI
 June 2008
 Quarterly Report



Figure 2
Hydrographs
CSMRI-1, CSMRI-4 and CSMRI-5

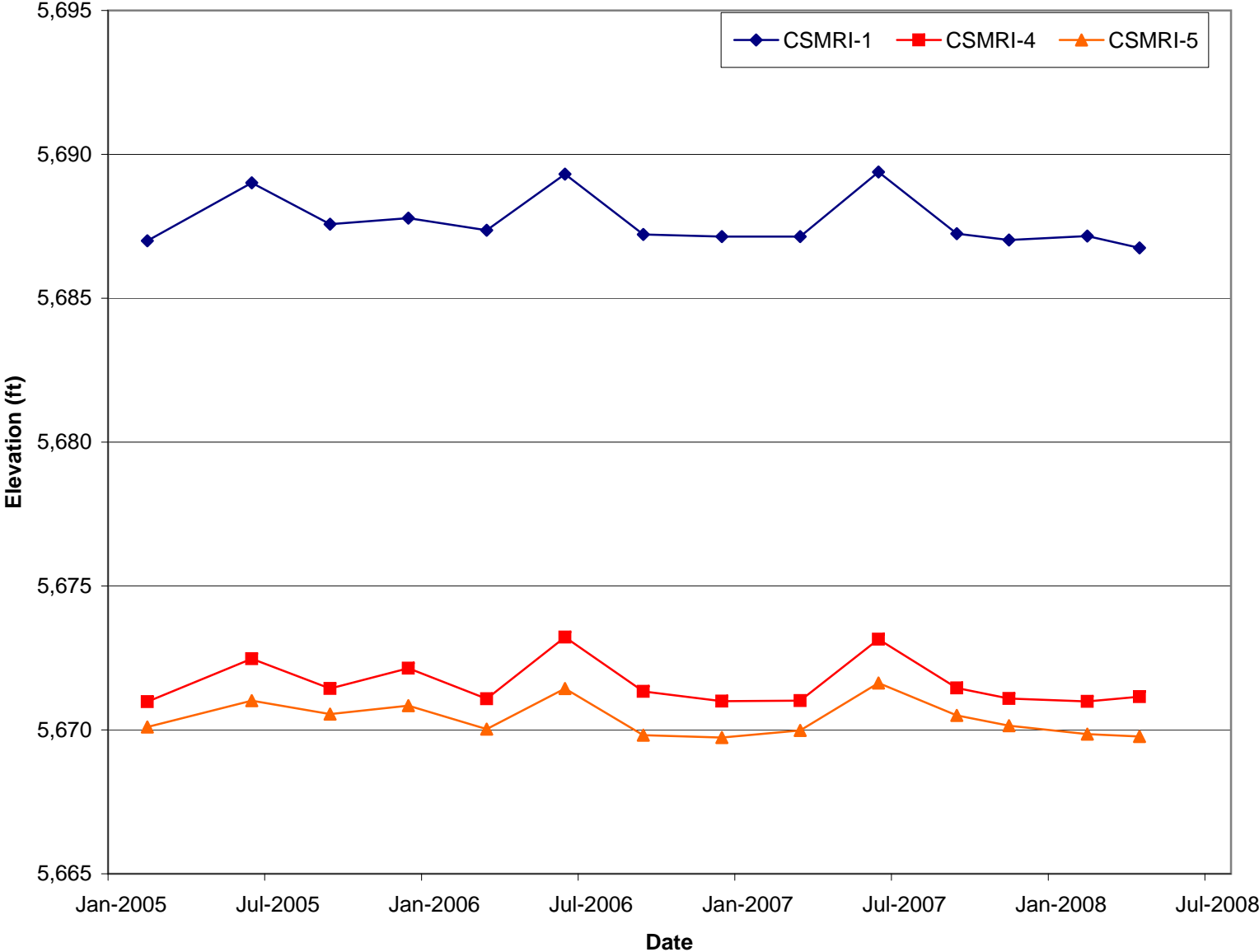


Figure 3
Hydrograph
CSRMI-2

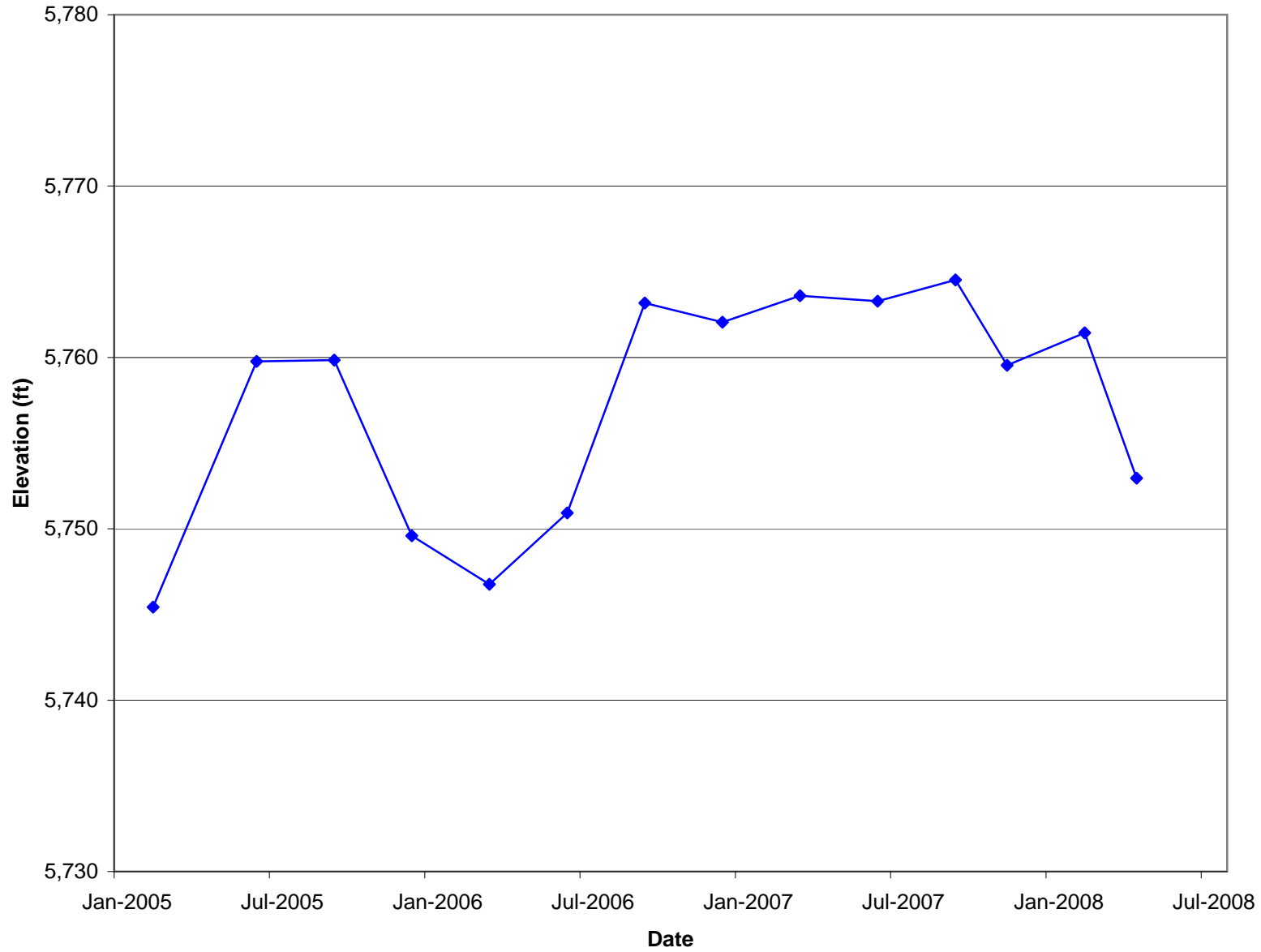


Figure 4
CSMRI-4
Historical Total Uranium Concentration

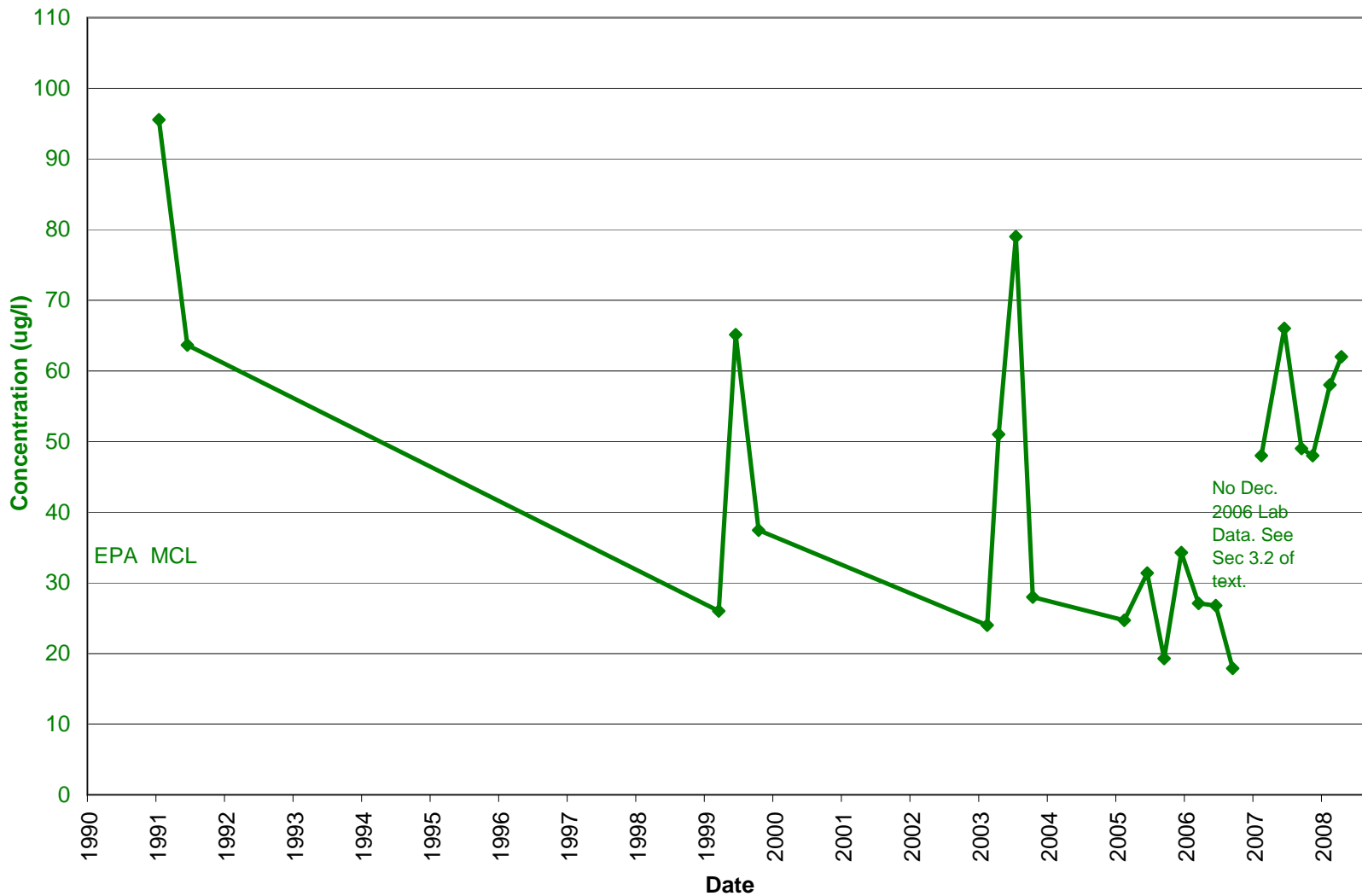
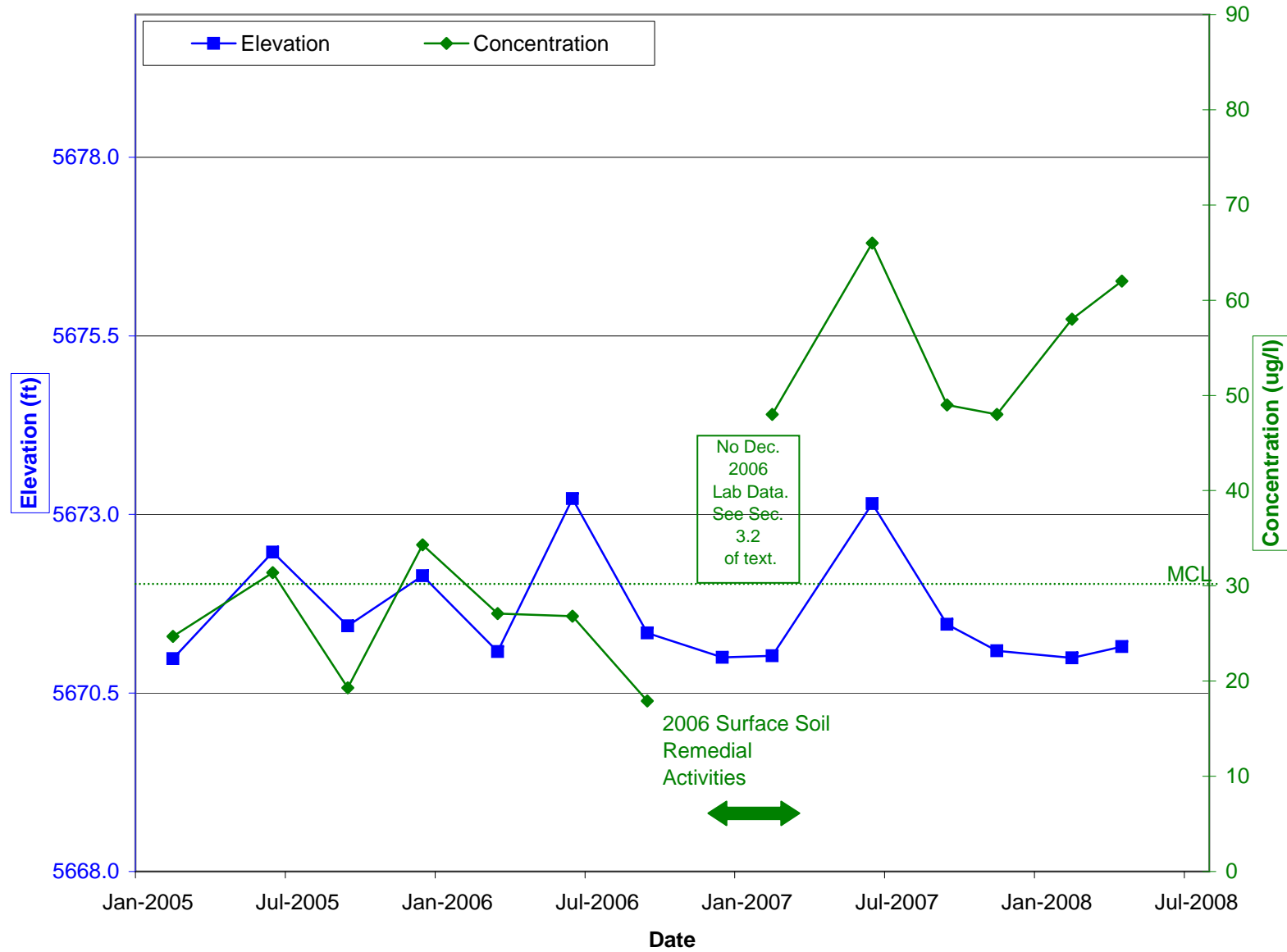


Figure 5
CSMRI-4
Total Uranium Concentration and Potentiometric Elevation



Appendix A

Groundwater Sampling Procedures

Appendix B
Sample Collection Forms

Appendix C

Surface Water Sampling Procedures

Appendix D

Data Validation Reports

Appendix E
Results of Analyses CD

Appendix F

Chains of Custody